are discussed in the frame of seasonal crop yield forecasting and assessment of climate change impacts on decadal time scales.

**A goodness-of-fit test for heavy-tailed distributions and its application to precipitation extremes**

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Extreme events, such as heavy precipitation, have a strong impact on both natural and human systems. Thus, it is essential to achieve a better characterisation and understanding of those phenomena. The natural statistical framework for the analysis of extreme values is the Extreme Value Theory. Since many issues in the available inference procedures still remain and reliability represents a key factor, a specific goodness-of-fit test for heavy-tailed distributions is here proposed. The procedure is proved to be valid and it is applied to daily global precipitation extremes simulated by a set of climate models of the Coupled Model Intercomparison Project Phase 5.

**A statistical approach to the study of the shallow aquifer in the Piedmont region (NW Italy)**

*Barbero D., De Luca D. A., Forno M. G., Lasagna M., Magnea L.*

We report on a statistical approach to the study of subsoil thermal data in order to establish if the Piedmont plain (NW Italy) is promising for geothermal purposes. The model we developed can be used during the preliminary stage of investigation for the exploitation of subsoil by means of low enthalpy geothermal plants.
As an example of our method, we performed a statistical analysis using groundwater thermometric data collected during the spring and autumn of 2009 in monitoring piezometers located in the Quaternary fluvial deposits hosting a shallow aquifer.
This study allowed us to determine the location of the homoeothermic surface, its depth range and the average value of the temperature with its associated uncertainty. This average value corresponds to the asymptotic behavior of the damped oscillations connected to seasonal temperature fluctuations found in the subsurface. The results we obtained are also in agreement with the solutions of the heat conduction equation with stationary boundary conditions.
Our method allows us to determine the statistical probability of finding a given groundwater temperature near the homeothermic surface, with a chosen confidence interval. This can be useful for example in planning to install “open loop” heat pump system. This methodology allows to significantly limit direct measurements, which would need to be widespread and repeated, and therefore expensive.